REVISED DRAFT

WORK PLAN
IN-WATER REMOVAL WORK

Bradford Island Landfill
Cascade Locks, Oregon

January 2002

Prepared for:

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LIST OF ABBREVIATIONS

APP	Accident Prevention Plan
BMPs	Best Management Practices
CCC	criterion continuous concentration
DEA	David Evans and Associates, Inc.
DEQ	Oregon Department of Environmental Quality
DQOs	data quality objectives
GPS	global-positioning system
IDW	investigation derived waste
K_{ow}	octonol-water partition coefficient
LDPE	low-density polyethylene
mg/kg	milligrams per kilogram
msl	mean sea level
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTU	Nephelometric Turbidity Units
ODFW	Oregon Department of Fish and Wildlife
PARCC	precision, accuracy, representativeness, comparability, and completeness
PCBs	polychlorinated biphenyls
PRGs	USEPA Region IX Industrial Soil Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance and quality control
SAP	Sampling and Analysis Plan
SPMDs	Semi-Permeable Membrane Devices
SVOCs	semivolatile organic compounds
TOC	total organic carbon
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
VOCs	volatile organic compounds
µg/L	micrograms per liter

1.0 INTRODUCTION

The Bradford Island Landfill is a former waste disposal site located at the Bonneville Lock and Dam Project near Cascade Locks, Oregon. U.S. Army Corps of Engineers (USACE) is the owner of the Bradford Island Landfill, and is in the process of investigating the landfill. USACE is conducting the landfill investigation under the oversight of the Oregon Department of Environmental Quality (DEQ), through the Voluntary Cleanup Program.

During hydrographic and underwater dive surveys conducted in October and November 2000, the USACE identified the presence of waste-related items, including electrical items that contain polychlorinated biphenyls (PCBs) submerged in the Columbia River adjacent to the Bradford Island Landfill. Some of the waste-related items were removed in December 2000. Analytical chemistry results from the sediment sampling conducted during the December 2000 recovery operations indicated the presence of PCBs. At the request of DEQ and United States Fish and Wildlife (USFW) (the "agencies"), USACE conducted an investigation of the river to help assess the extent and impacts of site-related contaminants. The scope of the investigation was based on the agencies' input and included sampling and analysis of water, sediment, and benthic aquatic specimens. The investigation also included simulation of impacts resulting from removal of wastes from the river. The findings of USACE's investigation were presented in the draft Bradford Island *In-Water Investigation Report*, dated September 2001 and URS's letter dated November 28, 2001. The final Bradford Island *In-Water Investigation Report* is expected to be available February 2002.

On the basis of the *In-Water Investigation Report,* the experience gained during the partial removal of debris in December 2000, and the available work window to meet fish protection goals, USACE determined that the PCB-containing electrical equipment should be removed during the current in-water work period (November 15 to March 15) to protect human and ecological receptors. USACE contracted URS Corporation (URS) to prepare the management plans for the removal of electrical equipment from the near-shore area of Bradford Island under Contract DACW57-99-D-0005 Delivery Order No. 0007. The work to be completed is specified in the statement of work of the delivery order.

This Work Plan summarizes the planned removal of electrical equipment from the river, introduces the project team and their responsibilities, and provides the schedule for the work. This Work Plan is one of three documents that make up the management plans prepared to describe the work. In addition to the Work Plan, a Sampling and Analysis Plan (SAP) which consists of the Field Sampling Plan (FSP) and the supporting Quality Assurance Project Plan (QAPP) have been prepared to provide detailed instructions for field sampling and laboratory procedures. The existing Accident Prevention Plan (APP) for the site establishes policies and procedures to reduce exposure to workers and prevent accidents.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION AND FEATURES

Bradford Island is part of the Bonneville Lock and Dam Project. At this location, the Columbia River forms the border between the states of Oregon and Washington (Figure 2-1). The landfill site is in the State of Oregon. The site is within the southwest quadrant of Section 22, Township 2 North, Range 7 East, Willamette Meridian. The site is not currently used as a part of the routine operation of the Bonneville Lock and Dam. The site is managed as a wildlife habitat for geese under the Bonneville Master Plan. No change from that land use is expected in the foreseeable future. Figure 2-2 shows the location of the landfill, the portion of the river investigated during the recent work, and the area of the proposed work.

The former landfill site is situated in the northeast corner of Bradford Island, upstream of Bonneville Dam. The elevation of the ground surface at the landfill is approximately 110 feet above mean sea level (msl). The normal elevation of the Columbia River adjacent to the landfill (the Bonneville Pool) is 72 feet msl. Bathmetric and side scan sonar surveys were conducted in the work area in October and November 2000. The depth of the river in the area where the electrical equipment removal will occur ranges from about 30 to 40 feet.

2.2 BACKGROUND

The landfill was used as a waste disposal site from the early 1940s until the early 1980s. Waste was reportedly disposed of in several individual pits excavated for this purpose within the landfill area, rather than in a single landfill cell. The landfill footprint covers about 130 feet by 300 feet.

2.2.1 Landfill Investigations

Previous investigations focused primarily on the landfill itself. On the surface of the landfill, a variety of wastes were observed, including plastic planter buckets, empty cans and paint solids, metallic slag, and partially-burned construction debris. Subsurface exploration identified a wide variety of waste, including broken glass, ceramic electrical insulators, rubber hose, wood, tires, metal debris, roofing paper, mercury vapor lamps, and pipe. On the northern edge of the island, north of the primary disposal area, wastes exposed at the surface included concrete rubble, steel cables, a few empty buckets and drums, and miscellaneous debris.

Analytical results of surface and subsurface soil samples collected from disposal areas showed relatively low concentrations of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), metals, herbicides, pesticides, and polychlorinated biphenyls (PCBs) (URS, 2000). Relatively low levels of VOCs, SVOCs, petroleum hydrocarbons, and metals have been detected in groundwater beneath the landfill (URS, 2000).

Two PCB-containing light ballasts were discovered at the landfill site in March 2000. The ballasts are components typical of the electric street lighting system at the Bonneville Lock and

Dam facility. The ballasts are cylindrical steel devices, approximately 18 inches tall and approximately 10 inches in diameter. The first ballast was observed on the north shore of Bradford Island in about one foot of water. The unit was discovered during the reconnaissance survey by URS to look for groundwater seeps. The second ballast was discovered by USACE personnel on the north slope of the island. USACE opened the sealed light ballasts and collected and analyzed samples of a tar-like substance contained in them for PCB content. These tests indicated that the ballasts contained PCBs at a concentration up to approximately 600 milligrams per kilogram (mg/kg). In March 2001, two additional ballasts, similar to those described above, were discovered along the river shoreline near the location of the groundwater seep. These units were not tested for PCB content.

2.2.2 In-Water Investigations

The discovery of the light ballasts on the shore of the island prompted an underwater survey that was conducted during October and November 2000. During the survey several additional electrical items were identified in the river adjacent to Bradford Island Landfill, including light ballasts, electrical insulators, lightning arresters, electrical switches, rocker switches, a breaker box, and electrical capacitors. Most of the waste-related items were observed in three distinct underwater piles. The locations of the three piles are shown on Figure 2-2. Divers recovered some of the electrical items. Other non-electrical wastes observed included a metal pipe, wire rope, concrete, an automobile bumper, and a stove.

In December 2000, approximately 60 electrical items were recovered from the eastern-most pile. Items recovered from the pile included post insulators, lightening arresters, electrical panels, and one interteen capacitor. Sediment samples were collected from areas close to where the electrical items were removed. Analytical chemistry results indicated that PCBs were present in the sediment samples at concentrations ranging from 0.15 mg/kg to 8.3 mg/kg.

In May 2001, an additional investigation was conducted to further characterize the area surrounding the underwater debris, and to assist the USACE in selecting the best method for removing the debris. The investigation included sampling of several matrices in the area surrounding the previously described piles, and a detailed survey of the location and an estimate of the volume of debris present.

The survey indicated that the offshore area of the Columbia River proximate to the Bradford Island Landfill contains three debris piles containing electrical equipment and other miscellaneous debris. A conservative estimate of the total amount of electrical equipment present is 8,462 cubic feet (313 cubic yards), along with an additional 176 cubic yards of non-electrical debris.

Sampling included collection of sediment, tissue and water column samples. Sediment samples were collected within and on the perimeter of two of the debris piles. The samples exhibited concentrations of PCBs, metals and SVOCs above selected ecological benchmark screening values. PCBs in sediments were detected ranging from non-detect to 23.9 mg/kg. Clams and crayfish collected in the debris piles exhibited PCB concentrations above background results.

A pilot-study simulating the underwater equipment removal was conducted. PCB-containing sediment was disturbed by a diver, thereby suspending the contaminated sediment into the water column. The water column sample containing the resuspended sediment was sampled and filtered. Both the particulate and aqueous phases of the samples exhibited PCB concentrations.

Semi-permeable membrane devices (SPMDs) were deployed in order to determine the concentration of bioavailable PCB concentrations near the debris piles at steady state conditions (i.e., not during a removal action). The SPMDs did not exhibit detectable concentrations of PCBs as Aroclors.

The May 2001 investigation results lead to the following conclusions:

- The offshore electrical equipment may constitute an ongoing human or ecological risk.
- The electrical equipment should be removed as soon as possible.

The equipment removal design described in this work plan was devised to minimize the potential risks associated with the removal, by minimizing the amount of sediment that would be entrained in the water column, and utilizing engineering controls to prevent resuspended sediments from being transported outside the work area.

3.0 PROJECT OBJECTIVES AND REMOVAL ACTIVITIES

3.1 PROJECT OBJECTIVES AND APPROACH

The purpose of the work described in this work plan is to remove the underwater debris from the Columbia River adjacent to Bradford Island, and collect water quality samples during the removal action. The project area includes the area surrounding the three previously described piles (see Figure 2-2). The water quality samples will identify the impact of the debris removal on river water quality and provide data to assess the baseline conditions of the site for future comparison.

The primary objectives of this project include the following:

- Remove the electrical items present in the Columbia River located proximate to the landfill.
- Conduct additional investigation during removal activities
- Protect the environment during removal

Sampling conducted during the debris removal will include the following:

- Collect and analyze 6 primary[1] water column samples from the area surrounding the underwater debris and an upgradient location.
- Conduct turbidity monitoring during the removal action from the area surrounding the underwater debris and from one upgradient location at least once every 4 hours.

The work plan has been designed to meet the project objectives and to minimize any resulting environmental impacts.

3.2 DEBRIS REMOVAL SCOPE

The proposed plan is to remove the estimated 313 cubic yards of electrical equipment (debris) and transport the material for disposal at an approved landfill. The other non-electrical debris will not be removed. The removal will be staged from barges and work boats mobilized to the work areas. The debris will be removed by commercial divers. Engineering controls will be implemented and daily monitoring will be conducted to minimize the potential off-site transport of resuspended sediments.

[1] Primary samples are collected to meet the objectives of the investigation as distinguished from quality assurance and quality control samples that are collected to characterize data quality.

3.2.1 Rationale and Design

The proposed plan to recover in-water debris was developed based on the following considerations:

- Implementability - the team and the money are available now, and the work can be conducted within the work period established by the Oregon Department of Fish and Wildlife to protect fish, November, 15-March 15 (ODFW, 2000).
- Proven effectiveness – the recovery and sampling approaches worked well during the limited debris recovery in December 2000, and the previous investigation in May 2001.
- Size of the project – the volume of electrical debris (313 cubic yards) is relatively small and anticipated to have a limited number of PCB containing components, therefore a simple and straightforward approach is warranted.
- Minimal adverse environmental risk – short-term increased exposure will be minimal because there is little potentially impacted sediment that could become resuspended in the water column.
- Compliance with water quality criteria – the removal method and engineering controls are expected to maintain compliance with ambient water quality criteria applied to in-water activities, in Oregon.

3.2.2 Field Procedures

Each debris pile will have a turbidity screen (see Section 5) deployed around the perimeter of each of the three piles before starting debris removal. Figure 3-1 depicts the locations of the piles, screens and monitoring locations, and Figure 3-2 depicts the profiles of the individual screens. The turbidity screens will be coupled with a floating oil absorbent boom. Each end of the screens will terminate at the shore, and the screens will surround the debris piles.

Before mobilization, the waterward corners of each of the three screens will be surveyed and marked with a float. Additionally, the monitoring locations (for turbidity) will also be surveyed and marked. Table 3-1 describes the estimated timeline for the field activities.

TABLE 3-1
Estimated Field Schedule

Work Day	Primary Field Activity
Day1	Survey screen corners and sampling locations and mark with a float.
Day 2	Mobilize crane and material barge, tug, and work boats to site.
	Complete safety meetings.
	Install turbidity screen at upstream pile (Pile #1).
	Collect turbidity measurements (see the SAP for schedule and procedures).
Days 3-7	Remove electrical equipment from Pile #1.
	Collect daily turbidity measurements and 2 water quality samples.
Day 8	Install turbidity screen at Pile #2, and begin removing electrical equipment.
	Collect daily turbidity measurements.
Days 9-13	Continue removing electrical equipment from Pile #2.
	Collect daily turbidity measurements and 2 water quality samples.
Day 14	Install turbidity screen at Pile #3 and begin removing electrical equipment.
	Collect daily turbidity measurements.
Days 15-17	Continue removing electrical equipment from Pile #3.
	Collect daily turbidity measurements and 2 water quality samples.
	Collect turbidity measurements within the screens for Piles #1 and #2 to determine if within 10% of background.
Day 18	If ready, remove screens from piles #1 and #2.
	Collect turbidity measurements within the screen for Pile #3.
Day 19	Remove screen from around Pile #3.

Following installation of the screen at one of the three specified piles, a spud barge mounted with a crane and a flat deck material barge will be positioned outside the screen and will serve as working and debris recovery platforms. A tug and one or two work boats will assist with the removal operations, monitoring and sampling.

Divers will search for and recover debris starting from one end of the debris pile using a line search method. The line search method will consist of searching along a 50 to 75 foot long line anchored in the search area. The search line will first be placed along one edge of a debris pile, approximately perpendicular to the shoreline. The divers will swim the length a line and search for electrical equipment, stopping to recover debris when it is found. Once all electrical equipment has been recovered along the search transect, the line will be advanced in 5 to 10 foot steps into the debris field until the area has been completely searched. This method will ensure that all electrical items are recovered. A video camera mounted on the diver's helmet will record underwater activities.

The crane barge can provide two recovery lines to the divers. One line will be used to lower and recover a 1 to 2 cubic yard submersible work box to collect small items. The other line will be used to directly attach to larger bulky items for individual recovery. When a piece of debris is encountered, the diver will assess whether the piece can be manually placed into the work box or whether the lifting cable for recovery is needed.

Before hoisting items, the diver, with assistance and direction from the surface team, will identify the type of item and assess whether the item could contain liquids. If liquid could be present in the item (e.g., intern capacitor or coupling capacitor), it will be partially raised and then placed into a reinforced 8-mil plastic bag and sealed, and then covered with an outer nylon mesh bulk bag. Items that are unlikely to contain liquids (e.g., lighting ballasts, electrical panels, or lightening arresters) will be lifted directly to the surface.

To minimize the potential for impacted sediments to leach residual contamination to the river, the sediments beneath a suspected liquid-containing item will be collected. The sediments immediately beneath the item will be removed using a small hydraulic pump (mounted on the work barge) fitted with a hose directed by the diver. The pump will be small enough so that only manageable volumes of water are generated, but adequate to remove newly exposed sediments. The water and sediment will be pumped directly into 55-gallon drums for later sampling and removal.

Once at the surface, each item will be placed into plastic-lined storage bins in a containment area on the materials barge. Any capacitors, if found, will be placed into 55-gallon drums. The containment area will be lined with oil absorbent mats and socks to prevent leakage into the river. If the storage bins are filled before all debris is recovered, the materials barge will be towed to an off-load location to exchange the full bins for empty ones. The time required to off-load the materials barge is not expected to delay removal activities.

The barges will be demobilized once all debris has been recovered. As soon as practical following the removal operation, the recovered items will be characterized and disposed of in an appropriate manner. The turbidity screens will remain in place until monitoring results indicate the work area turbidity measurements are within 10 percent of background levels (i.e. the readings in the work area are within 10 percent of the measurement made that day at the background location). After these levels are achieved, operations and monitoring equipment will be removed from the work area.

3.2.3 Action and Stop-Work Levels

The engineering controls (turbidity screens and associated oil boom) and other Best Management Practices (BMPs) were selected to minimize the potential off-site transport of re-suspended sediments. Turbidity monitoring during in-water removal activities will be used to measure the effectiveness of these controls and to monitor turbidity concentrations as compared to action levels established by the DEQ and stop-work levels established for this project.

The action levels and stop work levels presented herein are based on the current Oregon water quality standard for turbidity as codified in OAR 340-41-0205(2)(c) which allows turbidity (measured in Nephelometric Turbidity Units (NTUs)) no more than a 10% cumulative increase above background for legitimate in-water activities. This standard is a time-weighted threshold to compensate the transient nature of potential turbidity plumes that may result from the removal activities.

- Action Level – One monitoring event greater than 10% above background

- Stop Work Level – Two consecutive monitoring events (defined as 4 hours apart) greater than 10% above background

Turbidity will be monitored in accordance with the procedures and schedule in the SAP. If the turbidity action levels are exceeded (i.e., outside the screened work areas), the following steps will be implemented:

Action Levels Exceeded

- A visual inspection of the turbidity screen will be conducted to see whether it is still fully deployed and functioning properly. If repairs or adjustments are needed, they will be completed immediately.
- The debris removal rate will be assessed. The debris removal rate could be reduced if rapid removal is generating high turbidity levels.
- An additional turbidity measurement will be collected two hours following an exceedance of the action level, to check if adjustments have been effective.

Stop Work Levels Exceeded

- In-water work will be stopped until turbidity returns to within 10% of the background concentration.
- An additional turbidity measurement will be collected two hours following an exceedance of the stop work level, to check progress. of the plume.
- BMPs and controls will be re-evaluated and actions will be identified to possibly reduce turbidity.
- Notice will be given to DEQ, National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW) of the turbidity levels and the subsequent actions taken to reduce the levels. Work will resume when these measures have been implemented.

4.0 SAMPLING ACTIVITIES

4.1 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements that clarify technical and quality objectives, describe the intended use of the data, define the appropriate type of data needed to support decisions, identify the conditions under which the data should be collected, and specify the acceptable level of uncertainty in the data.

The overall DQOs for the sampling activities conducted in association with this removal action are to develop and implement field measurements, laboratory analyses, and reporting that will provide data quality that is consistent with its intended use. The intended uses of the data include the following:

- Assess the concentration of PCBs present in the water column in the work area during debris retrieval.
- Evaluate whether turbidity levels exceed pre-determined limits outside the work area.

Data must be of sufficient quality to support the intended uses listed above. Two levels of data quality and analysis are applicable for this project:

- Screening Level Data
- Definitive Data

DQOs, screening data and definitive data are further described in the QAPP.

4.2 OVERVIEW OF SAMPLING AND ANALYSIS PROGRAM

To accomplish the objectives outlined above, the sampling and analysis program during the removal action will include the following:

- Water-column sampling
- Turbidity monitoring

Sampling will be conducted to measure the concentration of PCBs and suspended sediment in the water column during debris removal. The scope of sample collection is summarized in this section. The SAP details sampling locations and specifies field and laboratory procedures.

4.2.1 Water-Column Sampling

To assess the concentration of PCBs present in the water column during the retrieval of the electrical items, a sample of the water and associated suspended sediment will be collected using a peristaltic pump. A diver will collect the sample by holding the intake end of the tubing in an area to be sampled. The water and sediment mix will be separated at the analytical laboratory.

The water and solids will be analyzed separately for PCBs (as Aroclors) and total organic carbon (TOC). Water column samples will be analyzed for PCBs by quantitating Aroclor mixtures. Any detected PCB concentrations will be compared to criteria that are reported in terms of Aroclors. The benchmark criteria are discussed further in Section 7.0.

Two water column samples will be collected in each of the three separate waste piles during recovery activities for a total of six samples. The samples will be collected inside the turbidity screens and sample collection will coincide with elevated turbidity in the work area, as reported by the diver.

4.2.2 Turbidity Monitoring

Turbidity is the apparent “cloudiness” of water produced as light is scattered by particulate matter or dissolved material (D&A Instruments, 1989). Turbidity is the water quality parameter most commonly used to identify dredge-induced sediment plumes (Puckette, 1998). Monitoring turbidity in the field with a turbidity meter is simple, inexpensive, and reliable and provides real-time data to assess the effectiveness of water quality protection measures (controls) during in-water activities.

Turbidity monitoring will be conducted in accordance with the schedule and procedures outlined in the SAP. Turbidity monitoring will coincide with debris removal. Six turbidity monitoring stations will be established (Figure 3-1). Turbidity profiles will be read from the meter at three depths in the water column. The turbidity at a particular location will be represented by the average of the three readings. Turbidity measurements will be taken at least once every four hours during debris removal. Visual observations will also be recorded. The turbidity measurements will be compared to established action levels and stop work threshold to assess whether adjustments to the controls (i.e., silt screen) are warranted. If a reading indicates an action or stop work level has been exceeded, an additional turbidity measurement will be collected two hours following the exceedance. Additionally, if a plume of turbid water is observed or measured, measurements will be collected within that visual plume to evaluate whether adjustments to the controls are warranted.

5.0 ENGINEERING CONTROLS FOR TURBIDITY

The engineering controls designed for this project were selected from proven technologies used to protect water quality during in-water activities. The primary control selected for the work described in this work plan is floating turbidity screen that will extend from the surface to the river bottom. The turbidity screen will be coupled with a floating oil absorbent boom. The objective of the turbidity screen and oil boom is to contain within the designated work area(s) sediments and floating contaminants that are temporarily re-suspended by the removal activity.

5.1 TURBIDITY SCREEN FABRIC

Filter fabric properties vary depending on the material type (e.g. polypropylene) and production method (e.g. woven vs. non-woven). The properties and performance of available materials were compared to project requirements and site conditions to select the appropriate material. Factors considered in selecting the filter fabric included the depth and topography of the river bottom, hydrologic and hydraulic conditions (e.g., river current), sediment type and expected size distribution, and project duration.

URS evaluated several varieties of turbidity screens previously used for dredging or similar shoreline projects and chose the TYPAR® 3631 as an acceptable filter fabric material. The TYPAR® 3631 is a nonwoven, polypropylene, puncture resistant fabric with high tensile strength and low permeability and is well suited for the project conditions (see TYPAR® 3631 Quality Assurance certificate in Appendix A).

5.2 DESIGN AND INSTALLATION

The turbidity screens will be prefabricated specifically for use during the removal actions at the Bradford Island site. The screens will be designed to match the existing bathymetry and site dimensions. Figure 3-1 depicts the locations of the screen, debris piles, and sampling locations, and Figure 3-2 depicts the profiles of the screens. The screens will consist of a filter fabric with flotation billets and a ballast sleeve and chain. Anchor blocks, screw anchors, and associated hardware will be used to connect the screen panels together and to secure the screen in place.

Each of the three work areas will be fully enclosed before starting debris removal. The coordinates indicated on the Figure 3-1 will be field-verified and marked with flagging or weighted buoys before installing the screens. The screens will be floated into position using a work boat and secured with screw anchors or rip-rap cable straps at the shoreline and with in-water anchor blocks every 25 to 50 feet along the length of the screens.

6.0 WASTE MANAGEMENT

Waste generated during the in-water removal action will be stored, handled, and disposed of as described below. This section describes expected types of waste, storage and handling procedures, and characterization method.

6.1 EXPECTED TYPES OF WASTE

Based on the previous survey, the electrical equipment that is planned to be removed during the this activity includes lightening arresters, interteen capacitors, light ballasts, switches, post insulators and other miscellaneous electrical equipment. The sampling methods and field analyses employed during this removal action will also generate Investigative Derived Waste (IDW) that may include dredge water, dredge sediments, decontamination water, personal protective equipment (PPE), and disposable equipment. The site history and the results of past investigations indicate that contaminants in the waste may include PCBs (electrical equipment), petroleum hydrocarbons, and some metals (sediment and decontamination water). The waste will also include the turbidity screen fabric.

6.2 HANDLING AND STORAGE

The recovered electrical equipment will be placed into plastic lined roll-off boxes located on the materials barge. The sediment and incidental water generated if a capacitor is found and dredging occurs (see Section 3.2.2) will be pumped to the surface with a clean hose and conveyed into in removable-head steel 55-gallon capacity drums (DOT 1A2) complete with lids, lid gaskets and bolts. If necessary, a separate drum will be used for each capacitor that is removed.

Decontamination water will be generated during the removal action if a diver may have been exposed to PCB contaminated items. The diver will be decontaminated in accordance with the Emergency Management Plan in the Dive Safety Plan. Decontamination water generated during the work will be stored on the materials barge in removable-head steel 55-gallon capacity drums (DOT 1A2) complete with lids, lid gaskets and bolts.

The PPE and disposable equipment will be placed in a plastic bag and stored on the material barge.

6.3 CHARACTERIZATION AND DISPOSAL

No samples will be collected for characterization of the electrical equipment. These items have been previously characterized and profiles are on file at the USACE project office.

Personal protective equipment will not require characterization, based on previous tests. The PPE can be disposed of in a commercial trash bin at Bonneville Dam and disposed of as solid waste. The turbidity screen will also not require characterization and will be disposed of as solid waste by USACE.

Dredge water, sediment, and decontamination water will require characterization before disposal. One sample of both water and sediment will be collected from the drums containing the dredged material. One sample of the decontamination water will be collected, if generated.

The USACE contractor will handle off-site disposal of the waste. A government representative must sign the manifest and other forms associated with the disposal.

7.0 DATA EVALUATION AND QUALITY ASSURANCE REVIEW

7.1 DATA EVALUATION

The results of the removal action and sampling data will be summarized in a report. The report will discuss the types and numbers of retrieved electrical items. The analytical results will be summarized in data tables. The tables will contain the appropriate data qualifiers assigned during the QA review, reporting limits, screening levels, and any non-detect results. The tables will be checked for consistency with the laboratory reports before they are used to interpret the data.

The report will contain of the following sections:

- Removal Activities: This section will inventory the recovered electrical items and discuss turbidity monitoring results. The numbers and locations of the retrieved items will be noted on the drawings.
- Field Sampling: The section will review field sampling procedures and note any deviations from the management plans. Sampling locations will be noted on drawings.
- Laboratory Analytical Results: Analytical results will be reported on a media-specific basis. Concentrations of individual contaminants will be plotted on drawings on a media-specific basis.
- Results Comparison: Detected concentrations will be compared to readily available screening values for sediments and water. The selected screening values are described below or are tabulated in the QAPP.

Published screening values and measured values will be reviewed to evaluate the results. Screening values were compared to laboratory practical quantitation limits to select appropriate analysis methods. A table summarizing the comparison is presented in the QAPP.

Water sample concentrations will be compared to the United States Environmental Protection Agency (USEPA) National Recommended Criterion Continuous Concentration (CCC) Water Quality Criteria (USEPA, 1999). The CCC criteria are estimates of the highest concentrations of a contaminant in surface water to which an aquatic community can be exposed indefinitely without resulting in an unacceptable effect. The DEQ also recognizes the CCC values as water quality criteria for the protection of human and aquatic life (DEQ, 1986).

7.2 DATA QUALITY ASSURANCE

7.2.1 Field Measurement Quality Assurance

Field turbidity measurements will be used to characterize the turbidity inside and outside of the turbidity screens during the removal action. The turbidity instrument will be used and calibrated daily according to the manufacturers' instructions and following procedures outlined in the SAP.

7.2.2 Laboratory Quality Assurance

Laboratory analyses will be conducted for the parameters described in Section 4.0. Data generated by the analytical laboratories will be generated, reduced, and verified according to procedures described in the laboratory QA plans, standard operating procedures, and EPA SW-846 analytical methods.

Data generated by the laboratories will also be reviewed for data quality by URS. The data quality review will include evaluations of compliance with specified analytical methods and project-specific precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters as described in the QAPP. Qualifiers will be added to data during the review, as necessary to identify data that do not meet data quality criteria.

After the fieldwork is complete and the final analyses have been reviewed, a QC summary report will be prepared by the project QA/QC manager. The report will summarize the QA information, indicate any corrective actions taken, and summarize the overall compliance with the SAP. The QA/QC report will be included as an appendix to the project report.

7.3 INDEPENDENT TECHNICAL REVIEW

An independent technical review of the report prepared for this project will be conducted. The review will be conducted by a qualified senior scientist or engineer not involved in the preparation of the reports. Documentation of the technical review will be provided to the USACE.

8.0 DATA MANAGEMENT AND REPORTING

8.1 DATA FILES AND RECORDS

Field data and analytical laboratory data will be generated during this removal action. Field measurements and observations will be recorded in a logbook or on the appropriate field form, as described in the SAP. Laboratory analytical data will be submitted to URS by the project laboratory in both electronic and paper form. Laboratory data will be transferred into the project database and reviewed for accuracy before it is used to interpret the results of the investigation. Original field and laboratory records will be stored in the URS project file.

8.2 REPORTING

8.2.1 Monthly Field Operations Safety Report

A monthly report will be provided to the USACE summarizing the safety record of the project. As summarized in the Accident Prevention Plan, the total man-hours spent during field work, including contractor and subcontractor personnel, will be tabulated in the report.

Monthly reports will be submitted by telephone or fax to Ms. Cheryl Frank by the 5th of each month during the contract period. Ms. Frank's telephone number is (503) 808-4822, and her fax number is (503) 808-4805.

8.2.2 Draft and Final Report

After field work is complete and analytical reports are received, a draft removal action report will be prepared and submitted to the USACE for review.

Comments generated by the USACE will be addressed, and the final report will be prepared and distributed in accordance with the delivery order statement of work.

9.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

9.1 SITE ACCESS AND SECURITY

Site access will be controlled at the point of entry at the Bonneville Project. URS and team subcontractor personnel are required to check in at the Bonneville Project office to obtain visitor identification cards that are to be worn at all times. Vehicle access cards will also be obtained at the Project Office. URS will attempt to give Dave Shank at the Bonneville Project five days notice before arriving on site to conduct field work.

If URS personnel or team subcontractor personnel are approached by the media, all questions and comments from the media will be directed to the USACE spokesperson Dawn Edwards.

If URS personnel or team subcontractor personnel observe intrusion of unidentified persons(s) in the restricted area, the Bonneville Project control room will be immediately notified. The phone number at the control room is (541) 374-8338.

9.2 USACE PROJECT MANAGER – MARK DASSO

The USACE Project Manager is responsible for directing the removal action in accordance with the USACE scope of work. He will monitor project progress by reviewing the monthly reports provided by the URS Project Manager. The USACE Project Manager may initiate delivery order modifications to address changing project requirements or unforeseen circumstances, if such modifications are deemed necessary to achieve the project objectives. He will be notified by telephone and email in advance of fieldwork by the URS Project Manager. Mr. Dasso's phone number is (503) 808-4728.

9.3 USACE TECHNICAL MANAGER – PAUL HUEBSCHMAN

The USACE Technical Manager will work with the URS Project Manager and URS Field Manager to ensure the work is completed in accordance with USACE engineering manuals and regulatory guidance. The USACE Technical Manager may initiate delivery order modifications to address changes to project requirements. Mr. Huebschman will be notified by telephone and e-mail in advance of the fieldwork by the URS Project Manager. Mr. Huebschman's phone number is (503) 808-4914.

9.4 USACE SITE CONTACT – BRIAN MCCAVITT

The USACE Site Contact will work with the URS Field Manager to coordinate the site work. Primary tasks will include providing access to the Bradford Island Landfill site and notifying USACE personnel of sampling activities at the site. Mr. McCavitt will be notified by telephone and e-mail in advance of fieldwork by the URS Project Manager. Mr. McCavitt's phone number is (541) 374-4575.

9.5 USACE DIVE SAFETY OFFICER – DON HIBBS

The USACE Dive Safety Officer will review the dive safety plan generated by the dive contractor for compliance with USACE requirements. He will also provide oversight of the contractor on diving specific issues. Mr. Hibbs' phone numbers are (541) 374-4591 (office) and (541) 980-1900 (mobile).

9.6 DEQ PROJECT MANAGER – MATT McCLINCY

The DEQ Project Manager may provide oversight during field activities at the Bradford Island Landfill site. He will be notified by telephone at least five days before starting field work by a USACE representative. Issues or concerns identified by the DEQ Project Manager will be directed to the USACE Project Manager, Mark Dasso. Mr. McClincy's phone number is (800) 452-4011.

9.7 URS PROJECT MANAGER – JEFF WALLACE

The URS Project Manager has overall responsibility for project activities and monitoring of the project progress. The URS Project Manager is responsible for planning, scheduling, cost control, and documenting completion of project tasks. The Project Manager also has overall responsibility for the development and implementation of this Work Plan, for monitoring the quality of the technical and managerial aspects of the project, interfacing with the USACE, and ensuring the timeliness of project deliverables. The URS Project Manager can be reached by telephone at (503)-948-7242.

9.8 URS ANALYTICAL CHEMISTRY TASK MANAGER – MADI NOVAK

The Analytical Chemistry Task Manager will be the QA manager for analytical chemistry. She will perform oversee the analytical laboratories and direct the review of chemical data. She will work closely with the URS Project Manager, the URS Field Manager, and the analytical laboratory. The Analytical Chemistry Task Manager can be reached by telephone at (503) 478-2766.

9.9 URS FIELD MANAGER – CHRIS MOODY

The URS Field Manager is responsible for coordinating and overseeing the field and field laboratory operations, including compliance with the SAP, change orders, scheduling, liaison with USACE, sample record keeping, as well as inventorying and documenting the waste removal activities. The URS Field Manager will also function as the Site Health and Safety Officer, and will be responsible for implementing of the Accident Prevention Plan, including reviewing its contents with project personnel, confirming that personnel have received the required health and safety training, determining personal protection levels, providing necessary personal protective equipment and supplies, and correcting any unsafe work practices. The URS Field Manager can be reached by telephone at (503)-948-7208.

9.10 URS INDEPENDENT TECHNICAL REVIEWER – DAVID WEYMANN

The URS Independent Technical Reviewer will perform an independent technical review of all project deliverables prepared under this contract and delivery order. The reviewer will not be involved in the preparation of the documents. The Independent Technical Reviewer can be reached by telephone at (503) 478-2769.

9.11 PROJECT TEAM

The companies that USACE has assembled for this project are summarized below along with their responsibilities. Figure 9-1 is a project team organization chart. Each company is responsible for the health and safety of its workers. However, URS has developed a written site-specific accident prevention plan (APP) and will provide the plan to all other team members, if directed to by the USACE. The URS APP addresses personal protective equipment appropriate for use when working around PCBs and other potential site contaminants. The URS plan does not address diving related hazards, rigging and lifting, or other specific work being performed by other USACE contractors.

USACE

USACE will coordinate field logistics with the dam operators, provide and operate a skiff from which the monitoring activities will be conducted, and contract with the team members (URS, Foss Environmental [Foss], and Advanced American Diving [Advanced American]).

URS

URS will direct, observe, and document the work performed by Advanced American and Foss, coordinate with the Advanced American to collect water column samples for analysis, survey the locations of waste items and sediment samples, and assist USACE with waste characterization and waste management. As for the previous in-water work, URS will subcontract David Evans and Associates, Inc. (DEA) to assist with the survey task using Global Positioning System (GPS) technology.

Advanced American Diving

Advanced American will provide a team of divers, two work barges, and a tugboat for recovery operations, and help URS collect water column samples.

Foss Environmental

Foss will manage the recovered waste items after they are brought to the surface by the divers, provide spill contingency planning and response, and assist USACE with waste characterization and waste management.

Table 9-1 is a list of the project team and the services they will be providing for this project.

TABLE 9-1
Project Team

SUBCONTRACTOR	SERVICE	ADDRESS AND CONTACT
URS	Contractor Oversight Sampling & Analysis	111 SW Columbia, Suite 900 Portland, OR 97201 Contact: Jeff Wallace (503) 222-7200
Severn Trent Laboratory, Seattle	Laboratory Analysis	5755 8th St. East Fife, WA 98424 Contact: Katie Downie (253) 922-2310
Advanced American Diving Service, Inc.	Diving Services	415 S. McLoughin Blvd. Oregon City, OR 97045 Contact: Mike Johns (503) 650-8207
Foss Environmental	Waste Management	5420 North Lagoon Avenue Portland Oregon 97217 Contact: John Peterson (503) 978-7271
David Evans and Associates, Inc.	Surveying of Sample and Turbidity Screen Locations	2828 SW Corbett Avenue Portland, OR 97201 Contact: Joanna Hawkins (503) 223-6663

The estimated dates of project milestones are listed in Table 10-1.

TABLE 10-1
Overall Project Schedule

ACTION	**ACTION BY**	**TENTATIVE DATE** (all dates are 2002)
Submit Draft Management Plans to the USACE & Agencies	URS	Monday, January 7
Submit Comments on Draft Plans	USACE	Friday, January 11
Submit Comments on Draft Plans	Agencies	Friday, January 18
Submit Final Management Plans to USACE and Agencies	URS	Friday, January 25
Begin In-Water Work	USACE/Project Team	Monday, February 11
End In-Water Work	USACE/Project Team	Friday, March 8
Receive Final Analytical Chemistry Results	URS	Monday, April 8
Complete Data Validation	URS	Monday, April 22
Submit Draft Project Report to USACE & Agencies	URS	Monday, May 6
Submit Comments on Draft Report	USACE/Agencies	Monday, May 20
Submit Final Report	URS	Monday, June 3

API (American Petroleum Institute). API publication no 4690, 2001, In Press.

DEQ, 1986, Oregon Department of Environmental Quality. 1986. Water Quality Standards and Beneficial Uses. OAR 340-041 Division 41.

URS. 2000. Supplemental Site Inspection, Bradford Island Landfill, Cascade Locks, Oregon. June 2000.

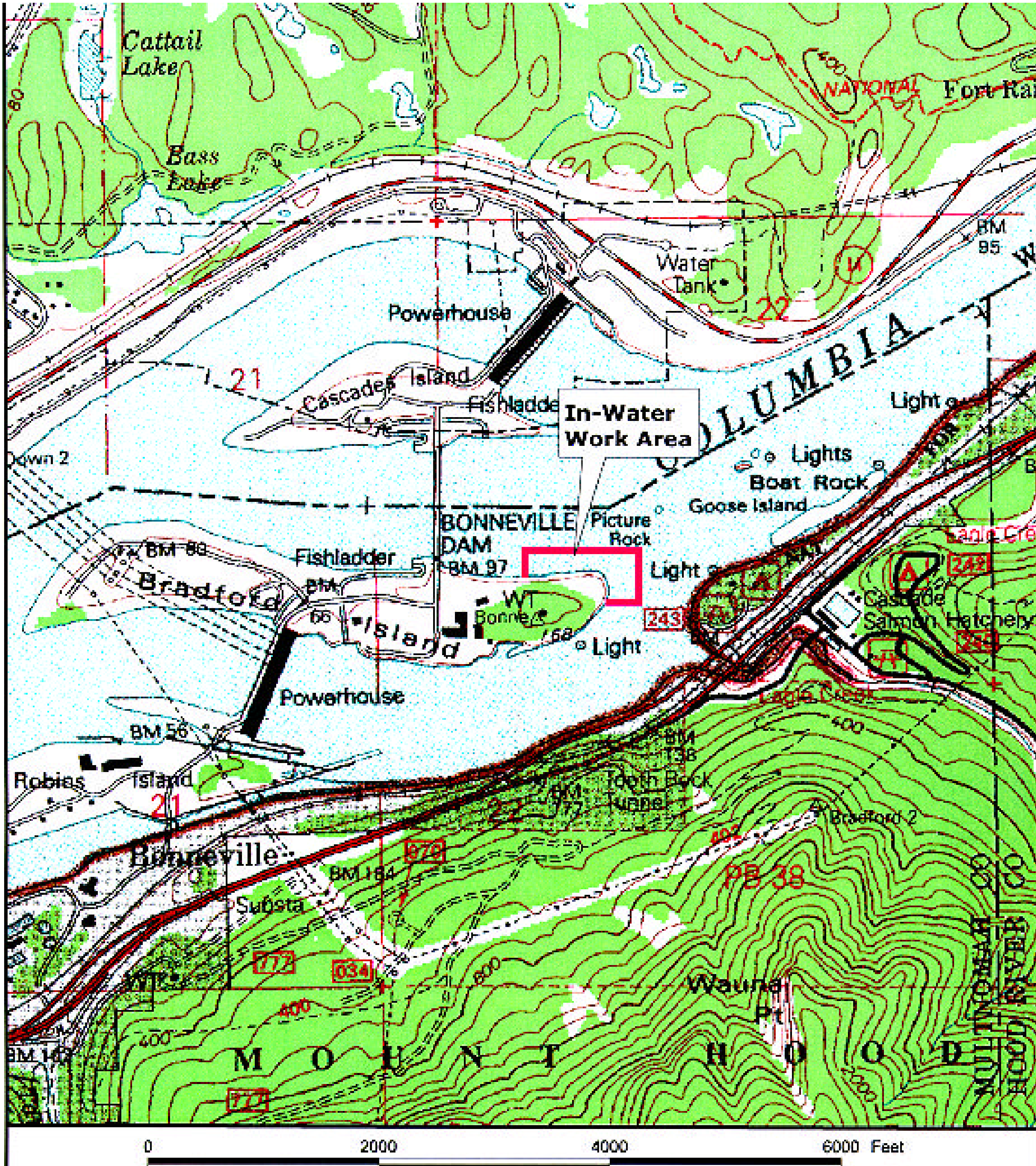
USEPA, 1999, United States Environmental Protection Agency. 1999. National Recommended Water Quality Criteria. Office of Water. EPA 822-Z-99-001.

D&A Instruments, 1989, Optical methods for measuring turbidity and suspended particles in water, some notes for users of OBS sensors, Technote (3/89).

ODFW, 2000, Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources, June.

Puckette, T.P. (1998) Evaluation of dredged material plumes Physical monitoring techniques, *DOER Technical Notes Collection* (TN DOER-E5), U.S. Army Engineer Research and Development Center, Vicksburg, MS. *www.wes.army.mil/el/dots/doer*.

FIGURES

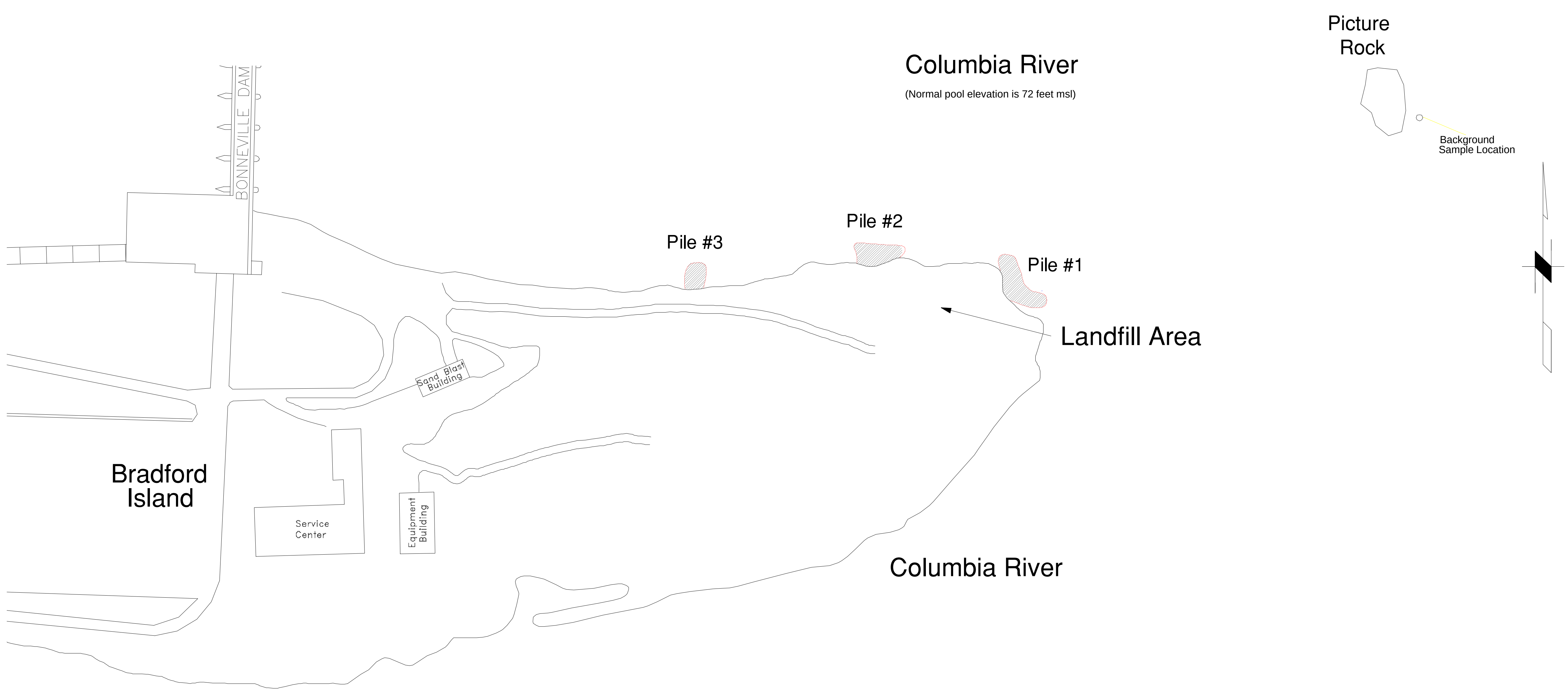


Project Number: 52-00080001.07 00001
Date: January 2, 2002
PDX, K:\bradford_island\apr\bradford_Jan02.apr

Figure 2-1

Vicinity Map
Bradford Island
Cascade Locks, OR

URS



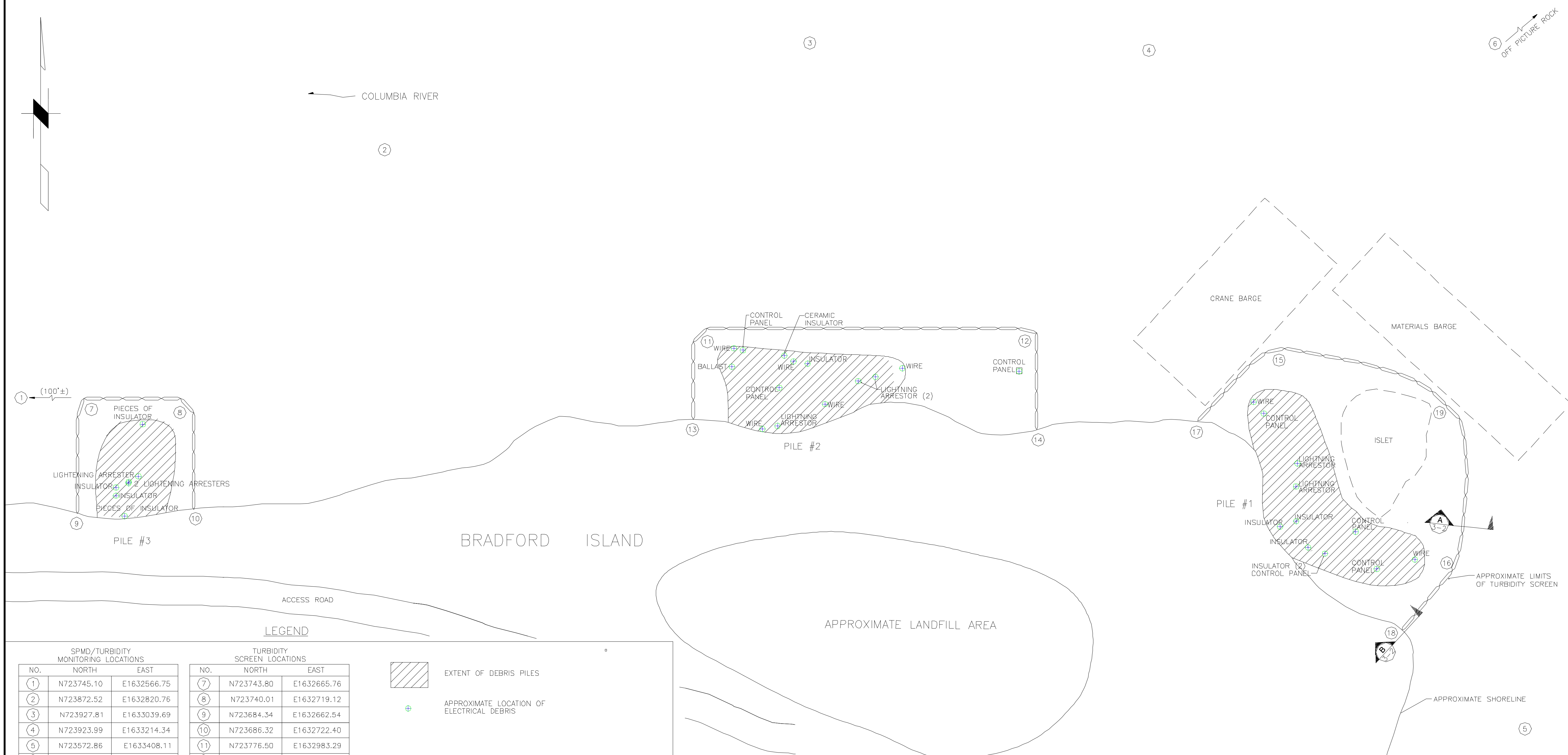
LEGEND

○ BACKGROUND SPMD AND TURBIDITY SAMPLE LOCATION

0 100 200 300 400 500
Approx. Scale

DESIGNED: MN	PROJ. ENGINEER:	**URS**	**BRADFORD ISLAND LANDFILL**	PROJECT AREA MAP	DRAWING NUMBER: FIGURE 2-2
DRAWN BY: jgdp	APPROVED BY: JW	111 S.W. Columbia, Suite 900 Portland, Oregon 97201 (tel) 503-222-7200 (fax) 503-222-4292	**CASCADE LOCKS, OREGON**		CAD FILE NUMBER: FIGURE 2-2
CHECKED BY: MN	DATE: 1/2/02				

I:\53-F0072173.00 Brdford\Delivery Order No. 07\FSP\FIGURE 2-2 no ms.dwg Jan 07, 2002 - 2:26pm



LEGEND

SPMD/TURBIDITY MONITORING LOCATIONS

NO.	NORTH	EAST
1	N723745.10	E1632566.75
2	N723872.52	E1632820.76
3	N723927.81	E1633039.69
4	N723923.99	E1633214.34
5	N723572.86	E1633408.11
6	N724186.60	E1633708.00

TURBIDITY SCREEN LOCATIONS

NO.	NORTH	EAST
7	N723743.80	E1632665.76
8	N723740.01	E1632719.12
9	N723684.34	E1632662.54
10	N723686.32	E1632722.40
11	N723776.50	E1632983.29
12	N723777.77	E1633156.52
13	N723732.99	E1632979.73
14	N723727.39	E1633156.32
15	N723768.85	E1633279.79
16	N723662.82	E1633374.53
17	N723732.09	E1633239.42
18	N723623.82	E1633344.65
19	N723740.44	E1633367.49

EXTENT OF DEBRIS PILES

APPROXIMATE LOCATION OF ELECTRICAL DEBRIS

NOTES

This drawing represents approximate positions of items designated by URS during the In-water Investigation.

Field work was conducted April 30 – May 4, 2001

Horizontal Datum: North American Datum of 1927 (NAD27). State Plane Coordinate System (SPCS), Oregon North Zone.

Approx. Landfill Area from SI Report (Tetra Tech 1998).

Barge positions will be shifted as removal progresses.

0 25 50
SCALE: 1" = 50'

No.	DATE	BY	REVISION

JOB No.: 52-00080001.07
DESIGNED: MN
PROJ. ENGINEER:
SCALE: AS SHOWN
DRAWN BY: CAS
APPROVED BY: JW
CHECKED BY: MN
DATE: 1/4/02

URS

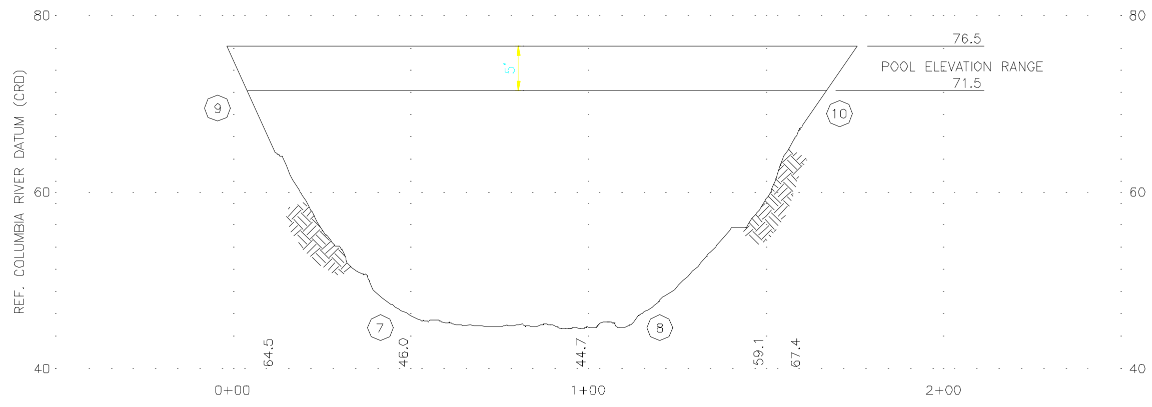
111 S.W. Columbia, Suite 900
Portland, Oregon 97201
(tel) 503-222-7200
(fax) 503-222-4292

BRADFORD ISLAND LANDFILL

CASCADE LOCKS, OREGON

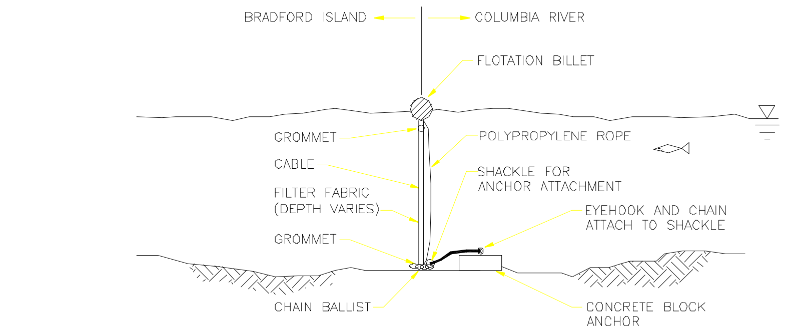
DEBRIS REMOVAL PLAN

DRAWING NUMBER: FIGURE 3-1
CAD FILE NUMBER: FIGURE 3-1
SHEET: OF
REV.

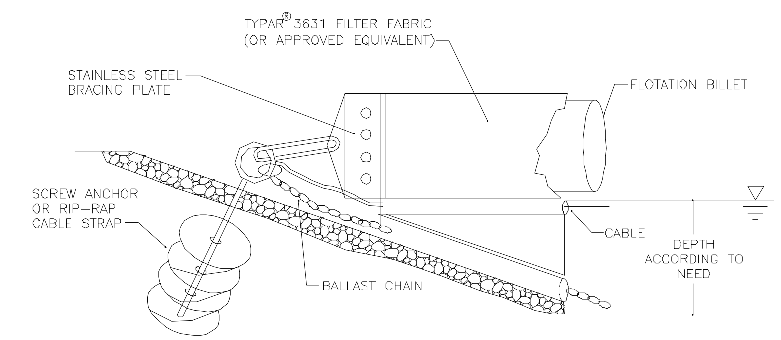


25 0 25 50
HORIZONTAL SCALE
5 0 5 10
VERTICAL SCALE

PILE #1 TURBIDITY SCREEN PROFILE (1)
N.T.S.



TURBIDITY SCREEN SECTION (A)
N.T.S.

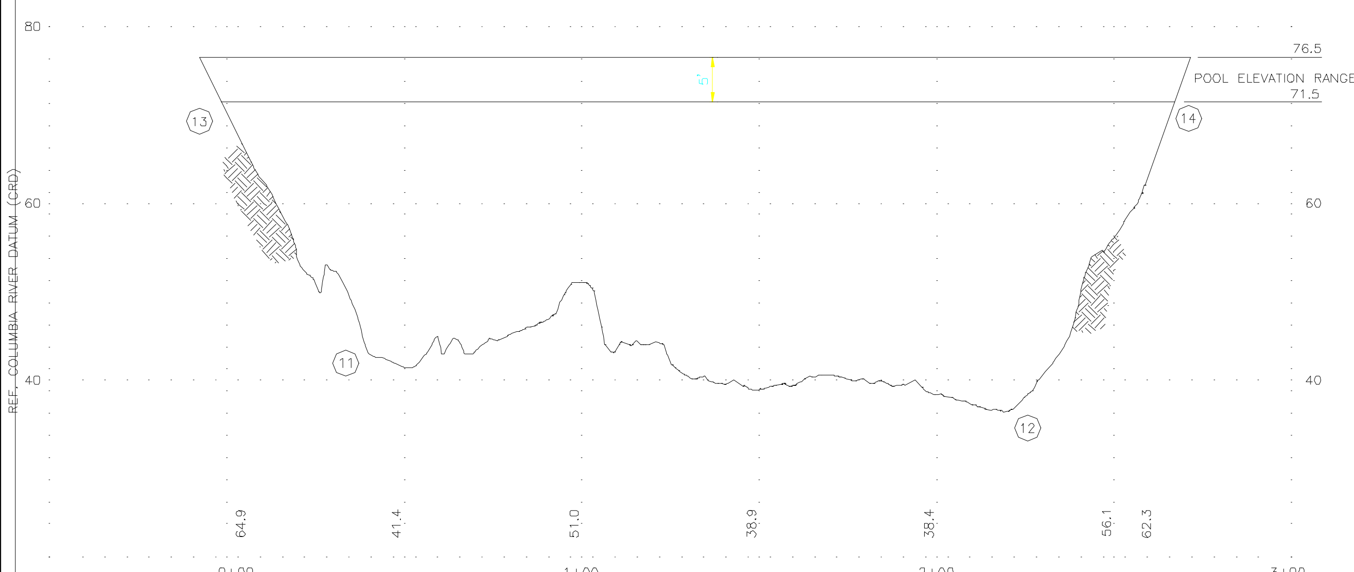


SHORELINE SECTION (B)
N.T.S.

PROFILE LEGEND

(15) PLAN VIEW COORDINATE LOCATION

EXTRAPOLATED PROFILE DUE TO BATHYMETRY DATA GAP-(USE FOR ALL)



PILE #2 TURBIDITY SCREEN PROFILE (2)
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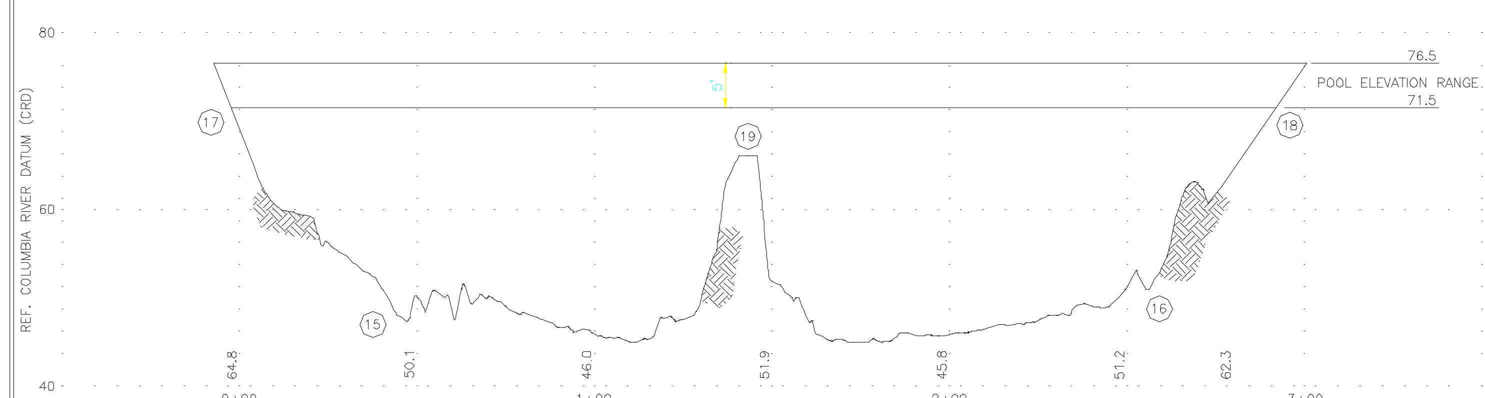


PILE #3 TURBIDITY SCREEN PROFILE (3)
N.T.S.

No.	DATE	BY	REVISION

JOB No.	DESIGNED:	PROJ. ENGINEER:
52-00080001.00	MN	
SCALE: AS SHOWN	DRAWN BY: CAS	APPROVED BY: JW
	CHECKED BY: MN	DATE: 1/4/02

URS

111 S.W. Columbia, Suite 900
Portland, Oregon 97201
(tel) 503-222-7200
(fax) 503-222-4292

BRADFORD ISLAND LANDFILL

CASCADE LOCKS, OREGON

DEBRIS REMOVAL PLAN

TURBIDITY SCREEN PROFILES AND DETAILS

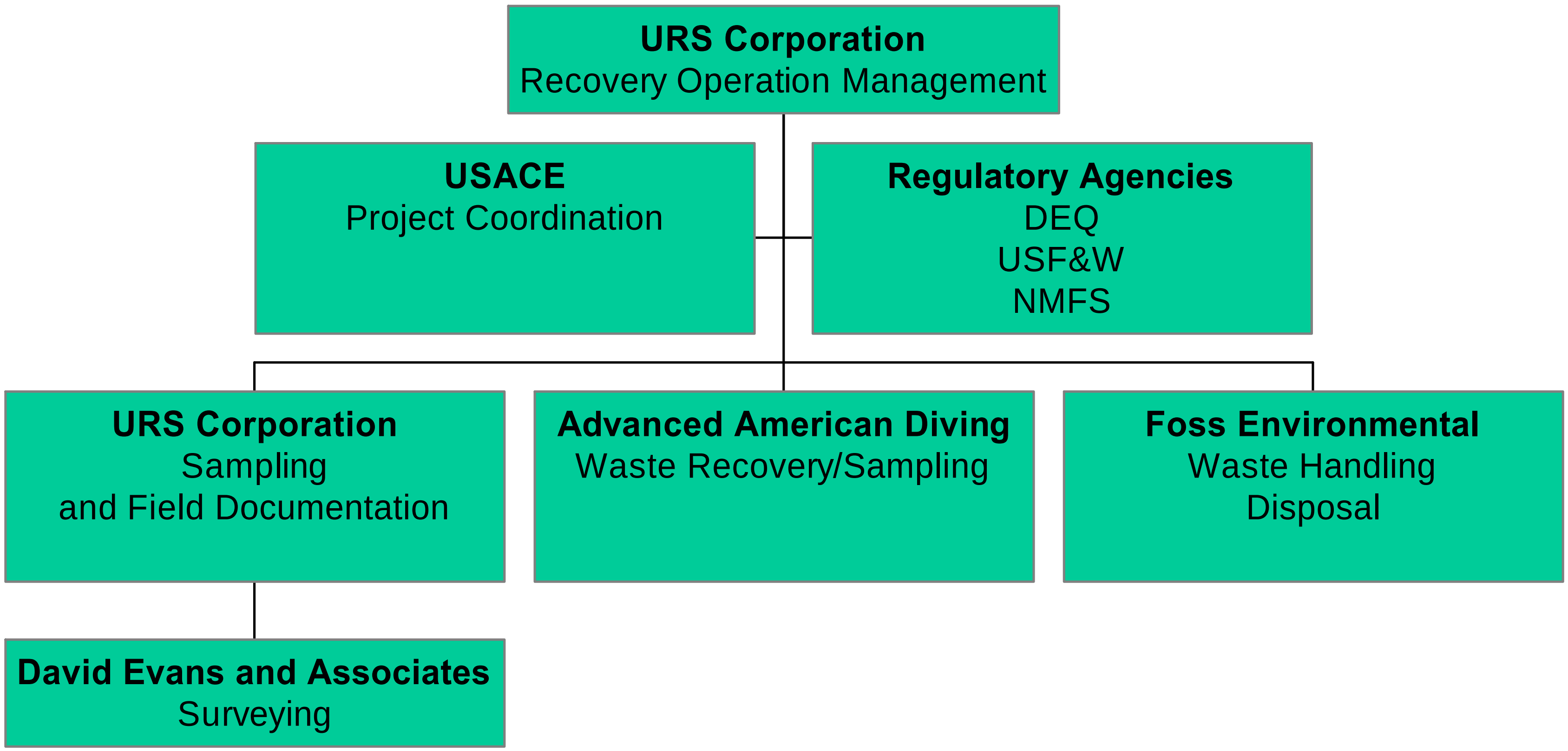
DRAWING NUMBER: FIGURE 3-2

CAD FILE NUMBER: FIGURE 3-2

SHEET: OF

REV.

FIGURE 9-1
Organization Chart
In-Water Waste Recovery Plan



LINQ
INDUSTRIAL FABRICS,INC.

GEOTEXTILE DIVISION

2550 WEST FIFTH NORTH STREET
SUMMERVILLE
SOUTH CAROLINA 29483-9669
800/543-9966
843/875-8277
FAX: 843/875-8276
www.linqind.com

June 19, 2001

GeoTK LLC
2300 E. First St.
Vancouver, WA 98661

Re: Order # 10006174

Dear Sir or Madam:

This letter is to certify that TYPAR® 3631, a nonwoven polypropylene fabric supplied by LINQ Industrial Fabrics, Inc., meets the fabric properties listed below:

PROPERTY	TEST PROCEDURE	METRIC		ENGLISH	
		MARV		MARV	
Grab Tensile Strength	ASTM D-4632	1113	N	250	lbs
Grab Elongation	ASTM D-4632	60	%	60	%
Trapezoid Tear	ASTM D-4533	401	N	90	lbs
Puncture	ASTM D-4833	356	N	80	lbs
Mullen Burst	ASTM D-3786	1703	kPa	247	psi
Permittivity	ASTM D-4491	.1	sec^{-1}	.1	sec^{-1}
Permeability	ASTM D-4491	.01	cm/sec	.01	cm/sec
A.O.S.	ASTM D-4751	.106	mm	140	U.S. Sieve
UV Resistance (150 hrs)	ASTM D-4355	70	%	70	%
Water Flow Rate	ASTM D-4491	326	lpm/m^2	8	gpm/ft^2

* MARV: Minimum Average Roll Value

Sincerely,

David M. Rhodes
Quality Assurance Supervisor